

HP OpenView Storage Mirroring

# Getting Started



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HP OpenView Storage Mirroring User's Guide

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# Storage Mirroring Server Requirements

Verify that each machine that will be used as an HP OpenView Storage Mirroring® source or target meets the following system requirements.

- ◆ **Operating System and Licensing**—There are different Storage Mirroring licenses depending on the operating system you are using. Be sure you have the correct license for your operating system.

License	Valid Operating System
WNE WNE Replication <sup>a</sup>	<ul style="list-style-type: none"><li>◆ Windows® Storage Server 2003 (Server or Advanced Server Edition) with SAK 3.0</li><li>◆ Windows 2000 Powered OS (Server or Advanced Server Edition) with SAK 2.0 or 2.5</li></ul>
Server Edition	<ul style="list-style-type: none"><li>◆ Windows Server 2003 Standard Edition</li><li>◆ Windows Server 2003 Web Edition</li><li>◆ Windows 2000 Server</li><li>◆ Windows NT 4.0 Server</li><li>◆ Windows NT 4.0 Terminal Server</li><li>◆ Any valid operating system which can be used with a Storage Mirroring WNE license</li></ul>
Advanced Edition	<ul style="list-style-type: none"><li>◆ Windows Server 2003 Enterprise Edition</li><li>◆ Windows 2000 Advanced Server</li><li>◆ Windows NT 4.0 Enterprise Edition</li><li>◆ Any valid operating system which can be used with a Storage Mirroring Server Edition license</li></ul>
Datacenter Edition	<ul style="list-style-type: none"><li>◆ Windows Server 2003 Datacenter Edition</li><li>◆ Windows 2000 Datacenter Server</li><li>◆ Any valid operating system which can be used with a Storage Mirroring Advanced Edition license</li></ul>

a. There are two WNE (Workgroup NAS Edition) licenses which run on the same operating systems. The WNE license contains full functionality while the WNE Replication license is limited to replication only. There is no failover functionality available with the WNE Replication license.

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**NOTE:** Any version of Windows NT 4.0 must have Service Pack 4 or higher.

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- ◆ **Storage Mirroring Version Interoperability**—Only particular Storage Mirroring versions (not editions) can interoperate. If both of your source and target are running the same Storage Mirroring version (for example, both are running version 4.4) there are no limitations.
- ◆ **Server Name**—Storage Mirroring includes Unicode file system support, but your server name must still be in ASCII format.
- ◆ **System Memory**—64 MB minimum
- ◆ **Disk Space**

Program Files	48 MB
Microsoft® Windows Installer Files	20 MB
Total	68 MB

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**NOTE:** The program file can be installed to any volume while the Microsoft Windows Installer files are automatically installed to the operating system boot volume.

During the installation, you will be identifying how much disk space to use for Storage Mirroring queuing. This disk space is in addition to the total disk space above.

If the server is a target storing replicated data, it needs sufficient disk space to store replicated data from all connected sources. Be sure to allow additional space for growth, if needed.

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- ◆ **Protocols and Networking**—TCP/IP with static IP addressing or reserved DHCP addressing
  - ◆ **E-mail Notification and Server Grouping**—In order to enable Storage Mirroring e-mail notification and/or save server groups, the server must have Internet Explorer 5.0 or later. Additionally, if you are using Windows NT 4.0, you must also have Windows Management Instrumentation (WMI) installed.
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# Storage Mirroring Installation

Review the Storage Mirroring *Installation notes* below and then use the appropriate installation instructions depending on your current configuration.

- ◆ *Installing Storage Mirroring* on page 3—Use these instructions if you are installing Storage Mirroring for the first time or have completely uninstalled a previous version of Storage Mirroring.
- ◆ *Installing Storage Mirroring automatically* on page 5—Use these instructions if you want to automate the Storage Mirroring installation.
- ◆ *Upgrading, modifying, or repairing Storage Mirroring* on page 10—Use these instructions if you already have Storage Mirroring installed and:
  - a. Are upgrading to a newer version.
  - b. Need to make modifications to an existing installation, such as install components that were not previously installed.
  - c. Need to repair errors in the program installation, such as fix or replace missing or corrupt files, shortcuts, or registry entries.
- ◆ *Removing Storage Mirroring* on page 12—Use these instructions if you need to uninstall Storage Mirroring.
- ◆ *Removing Storage Mirroring automatically* on page 13—Use these instructions if you want to automate the Storage Mirroring uninstallation.

## Installation notes

- ◆ Since Storage Mirroring installs device drivers, it is recommended that you update your Windows Recovery Disk, before installing or making changes to your servers. For detailed instructions on creating a recovery disk, see your Windows reference manuals. Make sure that you select the option to backup the registry when building the repair disks.
- ◆ Because Storage Mirroring has operating system dependent files, if you are upgrading your operating system (to a new major version, not a service pack) and have Storage Mirroring installed, you must remove Storage Mirroring prior to the operating system upgrade. Use the steps below as a guideline.
  - a. Uninstall Storage Mirroring.
  - b. Perform the operating system upgrade.
  - c. Install Storage Mirroring.
- ◆ If you are installing to a drive other than the drive which contains your system TEMP directory, the Microsoft Windows Installer will still load approximately 100 MB of data to the TEMP directory during the installation. If you do not have enough disk space on the drive that contains the TEMP directory, you may need to change where it is located.
- ◆ During installation, a file called `dtinfo.exe` is installed to the Storage Mirroring installation directory. This program can be run to collect configuration data for use when reporting problems to customer support. It gathers Storage Mirroring log files; Storage Mirroring and system registry settings; network configuration information such as IP, WINS, and DNS addresses; and other data which may be necessary for customer support to troubleshoot issues. After running the executable, a zip file is automatically created with the information gathered.
- ◆ During the installation, it checks to see if Microsoft Cluster Service (MSCS) is installed, and if so, installs and registers the cluster resources. If MSCS is not installed when Storage Mirroring is installed, these steps are skipped. If you already have Storage Mirroring installed and then install Microsoft Cluster Service (MSCS), you will need to perform an Update install as outlined in *Upgrading, modifying, or repairing Storage Mirroring* on page 10 and the resources will be installed and registered.
- ◆ The *User's Guide* online manual and online help provide additional means of accessing product information. The online manual, `dtuser.pdf`, is located on the CD in the `\docs` directory. Review the *Preface* of the online manual for details on accessing the manual and online help after an installation.

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## Installing Storage Mirroring

Use these instructions if you are installing Storage Mirroring for the first time or if you have completely uninstalled any previous version of Storage Mirroring.

1. Close any open applications.
2. Start the installation program by loading the Storage Mirroring CD into the local CD-ROM drive. If auto-run is enabled, the program will start automatically. To manually start the program, select **Start, Run** and specify:  
`<cd_drive>:\autorun.exe`
3. When the Storage Mirroring installation program begins, the Welcome screen is displayed. Click **Next** to continue.
4. Review and accept the Storage Mirroring license agreement to continue with the installation program. Click **Next** to continue.
5. On the Storage Mirroring Setup dialog box, there are two selections available:
  - ◆ **Client and Server Components**—Installs the Storage Mirroring server and client components on the local machine.
  - ◆ **Client Components Only**—Installs the Storage Mirroring client on the local machine.Select either option and click **Next** to continue.
6. Select the type of Storage Mirroring installation.
  - ◆ **Complete**—All program features will be installed.
  - ◆ **Custom**—Allows you to choose which program features will be installed.

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**NOTE:** If you have selected the **Client Components Only, Complete** installation, continue with step 14.

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7. If you selected the **Custom** installation, select the components that you wish to install and the path where you want the files located. Click **Next** to continue.

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**NOTE:** If you have selected the **Custom, Client Components Only** installation, continue with step 14.

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8. You will be prompted to enter your **User Name, Organization, and Activation Code**. The code is a 16-character, alpha-numeric activation code which applies the appropriate Storage Mirroring license to your installation. Click **Next** to continue.

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**NOTE:** If you have entered an incorrect or blank activation code, you will be prompted that the code is incorrect and that the Storage Mirroring source and target modules will not load. When prompted to continue, select **Back** and reenter your activation code.

If you have entered an evaluation code, the expiration date will be displayed and you will be prompted that the Storage Mirroring source and target modules will not load after that date. When prompted to continue, select **Next** to continue.

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9. Review the registration information and confirm that it is accurate by clicking **Next**. If you click **Back**, you will be returned to the registration information screen to correct the information.
  10. Storage Mirroring uses system memory to store data in queues. Specify the maximum amount of system memory to be used for the Storage Mirroring queues and click **Next** to continue. The default setting is 128 MB. If you set it lower, Storage Mirroring will use less system memory, but you will queue to disk sooner which may impact system performance. If you set it higher, Storage Mirroring will maximize system performance by not queuing to disk as soon, but the system may have to swap the memory to disk if the system memory is not available. In general, the amount of memory Storage Mirroring and other applications on the server are configured to use should be less than the amount of physical memory on the system to prevent low memory conditions.
  11. When the Storage Mirroring system memory queue is exhausted, Storage Mirroring will queue to disk. Specify the size and location of the disk queue. By default, the disk space is set to **Unlimited** which will allow the queue usage to automatically expand whenever the available disk space expands. Click **Next** to continue.
  12. If you are using Windows NT 4.0, in order for the Storage Mirroring failover capabilities to assume the IP address(es) of your source(s) during failover, you must create placeholders equal to the greatest number of IP addresses the target may need to assume at any given time. By default, five placeholders are created on each NIC. To change the number of placeholders for each available NIC, enter the number of placeholders you want created in the **Placeholders** field. Click **Next** to continue.
  13. The Storage Mirroring security information screen appears next. Review this information and click **Next** to continue with the installation.
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14. If you are satisfied with the selections you have made and are ready to begin copying the Storage Mirroring files, click **Install**.
  15. After the files have completed copying, click **Finish** to exit the installation program.

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**NOTE:** If you do not restart your computer when prompted, you must reboot the system prior to starting Storage Mirroring.

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The Storage Mirroring installation is complete.

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## Installing Storage Mirroring automatically

The Storage Mirroring installation program can accept command-line parameters which allow you to automate the installation process by running an unattended, or silent, installation. The silent installation allows you to pass parameters through to the installation program instead of entering information manually during the installation.

Since the automated Storage Mirroring installation does not prompt for settings, the settings are manually defined in a configuration file called DTSetup.ini.

By default, DTSetup.ini contains default values for each parameter. These parameters are divided into three sections.

- ◆ The first section, [Double-Take], specifies the setup type, the activation code to be used on the server and if the system should automatically reboot. This section applies to all types of installations.
- ◆ The second section, [Client], specifies the parameters that will be used for a client only installation.
- ◆ The third section, [Windows] specifies the server settings that will be using for extended queuing, clustering support, SNMP and the TCP/IP ports used to communicate with other servers.

Each section is outlined in the following tables.

**Silent Installation [Double-Take] Options**

Entry	Valid Parameters
DTSetupType	<ul style="list-style-type: none"><li>◆ DTNT—Storage Mirroring server and client installation</li><li>◆ DTCO—Client only installation</li></ul>
DTActivationCode	<ul style="list-style-type: none"><li>◆ If you are installing a single or site license, enter the activation code.</li><li>◆ If you are installing to multiple machines, create additional sections at the bottom of the setup file corresponding to each machine name. See the note below.</li></ul>
AutoReboot	<ul style="list-style-type: none"><li>◆ Y or 1—Reboot the machine automatically after the installation, if it is required</li><li>◆ N or 0—Do not reboot the machine automatically after the installation</li></ul>

- ◆ The entries in the [Client] section will be used if the value of DTSetupType is DTCO.
- ◆ The entries in the [Windows] section will be used if the value of DTSetupType is DTNT or GC.

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**NOTE:** The installation reads the value of DTSetupType and then processes the corresponding section of the setup file.

You can create unique automated installs for individual machines by specifying additional entries at the bottom of the file that will override the default settings. For example, you might add the following to the end of the file:

```
[Machine_Name1]
DTActivationCode=01a2b000340c056d

[Machine_Name2]
DTActivationCode=d650c043000b2a10
```

Entries not specified under a machine heading, will use the default settings.

---



### Silent Installation [Client] Options

Entry	Valid Parameters
DoubleTakeFolder	Enter any valid path for the location of the Storage Mirroring client files
ManagementConsole	<ul style="list-style-type: none"> <li>◆ Y—Install the Management Console and Failover Control Center clients</li> <li>◆ N—Do not install the Management Console and Failover Control Center clients</li> </ul>
TextTools	<ul style="list-style-type: none"> <li>◆ Y—Install the text clients</li> <li>◆ N—Do not install the text clients</li> </ul>
ClusterClient	<ul style="list-style-type: none"> <li>◆ Y—Install Storage Mirroring client resource files. The files installed with this setting allow you to manage the Storage Mirroring cluster resource from a machine that may not necessarily be a part of the cluster.</li> <li>◆ N—Do not install Storage Mirroring client resource files. Without these files, you will not be able to manage the Storage Mirroring cluster resource</li> </ul>
SNMP	<ul style="list-style-type: none"> <li>◆ Y—Install the SNMP components</li> <li>◆ N—Do not install the SNMP components</li> </ul>

### Silent Installation [Windows] Options

Entry	Valid Parameters
DoubleTakeFolder	Enter any valid path for the location of the Storage Mirroring client files
QMemoryBufferMax	Enter any integer representing the amount of system memory, in MB, to use for memory-based queuing.
DiskQueueFolder	Enter any valid path to a fixed, local NTFS drive for the location of the disk-based queue
DiskQueueMaxSize	Enter any integer representing the amount of disk space, in MB, to use for disk-based queuing or the keyword <b>UNLIMITED</b> which will allow the queue usage to automatically expand whenever the available disk space expands.
DiskFreeSpaceMin	Enter any integer representing the amount of disk space, in MB, that must remain free at all times.
ManagementConsole	<ul style="list-style-type: none"> <li>◆ Y—Install the Management Console and Failover Control Center clients</li> <li>◆ N—Do not install the Management Console and Failover Control Center clients</li> </ul>
TextTools	<ul style="list-style-type: none"> <li>◆ Y—Install the text clients</li> <li>◆ N—Do not install the text clients</li> </ul>
ClusterClient	<ul style="list-style-type: none"> <li>◆ Y—Install Storage Mirroring client resource files. The files installed with this setting allow you to manage the Storage Mirroring cluster resource from a machine that may not necessarily be a part of the cluster.</li> <li>◆ N—Do not install Storage Mirroring client resource files. Without these files, you will not be able to manage the Storage Mirroring cluster resource</li> </ul>
SNMP	<ul style="list-style-type: none"> <li>◆ Y—Install SNMP</li> <li>◆ N—Do not install SNMP</li> </ul>
ClusterServer	<ul style="list-style-type: none"> <li>◆ Y—Install both Storage Mirroring client and server cluster resource files. The files installed with this setting allow you to run and manage the Double-Take cluster resource from a cluster node.</li> <li>◆ N—Do not install Storage Mirroring client and server resources files. Without these files, you will not be able to run or manage the Storage Mirroring cluster resource.</li> </ul>
DTServiceStartup	<p>If you are using the <b>DTNT</b> option, specify:</p> <ul style="list-style-type: none"> <li>◆ Y or 1—Start the Storage Mirroring service automatically</li> <li>◆ N or 0—Do not start the Storage Mirroring service automatically</li> </ul>
Netport	If you are using Storage Mirroring in a NAT environment, enter any integer between 1024 and 65535 to identify the port for TCP communications.

Entry	Valid Parameters
DirUNetport	If you are using Storage Mirroring in a NAT environment, enter any integer between 1024 and 65535 to identify port for TCP communications.
UNetport	If you are using Storage Mirroring in a NAT environment, enter any integer between 1024 and 65535 to identify the port for UDP communications.

#### Example DTSetup.ini for Full Installation

```
[Double-Take]
DTSETUPTYPE=DTINT
DTACTIVATIONCODE=01a2b000304c056d
AUTOREBOOT=Y

[Windows]
DOUBLETAKFOLDER="C:\Program Files\Openview\Storage Mirroring"
QMEMORYBUFFERMAX=128
DISKQUEUEFOLDER="C:\Program Files\Openview\Storage Mirroring"
DISKQUEUEMAXSIZE=UNLIMITED
DISKFREESPACEMIN=50
MANAGEMENTCONSOLE=Y
TEXTTOOLS=Y
CLUSTERCLIENT=Y
SNMP=N
CLUSTERSERVER=Y
DTSERVICESTARTUP=1
DTFAILOVERSTARTUP=1
PLACEHOLDERCOUNT=5
NETPORT=1100
DIRUNETPORT=1105
UNETPORT=1100
```

#### Example DTSetup.ini for Client Only Installation

```
[Double-Take]
DTSETUPTYPE=DTCO
AUTOREBOOT=N

[Client]
DOUBLETAKFOLDER="C:\Program Files\Openview\Storage Mirroring"
MANAGEMENTCONSOLE=Y
TEXTTOOLS=Y
CLUSTERCLIENT=Y
SNMP=N
```

Use the appropriate instructions on the following page depending on if you are performing a local or remote Storage Mirroring installation automatically.

---

◆ **Local, automatic Storage Mirroring installation**

1. Create a temporary directory on the machine. For example, create c:\dtinstall.
2. Copy the files from the Db1Take\NT2000 directory on the Storage Mirroring CD-ROM to the temporary directory.
3. From a command prompt, remove the read-only attributes from the files in the temporary directory by using the command `attrib *.* -r`.
4. Make a backup copy of the default DTSetup.ini file in the temporary directory.
5. Edit DTSetup.ini as needed using the values described in the previous tables.
6. Determine the exact file name of your setup file by using the command `dir setup*.*` from the temporary directory command prompt. Depending on how you received your software (CD or web), your setup file name will be named `setup.exe` or `setup_xxxx.exe` where `xxxx` is four numbers that specify the build number. For example, your setup file might be called `setup.exe` or `setup_1352.exe`.
7. Run one of the following case-sensitive commands from the temporary directory, depending on if you have `setup.exe` or `setup_xxxx.exe` where `xxxx` is a four digit build number.

```
setup /s /v"DTSETUPINI=\"c:\dtinstall\DTSetup.ini\" /qn"
setup_xxxx /s /v"DTSETUPINI=\"c:\dtinstall\DTSetup.ini\" /qn"
```

---

**NOTE:** The command must be run from the directory where the temporary files are located as well as specifying that directory for the `.ini` file.

Spacing is critical with this command. A space should precede `/s`, `/v`, and `/qn` but should not appear anywhere else for the command to work correctly.

---

8. After the installation is complete, reboot the machine.

---

**NOTE:** If you have configured the AutoReboot option to yes, the machine will automatically reboot.

---

◆ **Remote, automatic Storage Mirroring installation**

1. Create a temporary directory on the primary site server. For example, create z:\dtinstall.
2. Share the temporary folder.
3. Copy the files from the Db1Take\NT2000 directory on the Storage Mirroring CD-ROM to the temporary folder.
4. From a command prompt, remove the read-only attributes from the files in the temporary directory by using the command `attrib *.* -r`.
5. Make a backup copy of the default DTSetup.ini file in the shared folder.
6. Edit DTSetup.ini as needed using the values described in the previous tables.
7. From each machine where you want to install Storage Mirroring, map a drive to the temporary directory that you created in step 1. For example, you might map your `m:` drive to the share.
8. Determine the exact file name of your setup file by using the command `dir setup*.*` from the mapped drive command prompt. Depending on how you received your software (CD or web), your setup file name will be named `setup.exe` or `setup_xxxx.exe` where `xxxx` is four numbers that specify the build number. For example, your setup file might be called `setup.exe` or `setup_1352.exe`.
9. Run one of the following case-sensitive commands from the mapped drive, depending on if you have `setup.exe` or `setup_xxxx.exe` where `xxxx` is a four digit build number.

```
setup /s /v"DTSETUPINI=\"m:\DTSetup.ini\" /qn"
setup_xxxx /s /v"DTSETUPINI=\"m:\DTSetup.ini\" /qn"
```

---

**NOTE:** The command must be run from the shared folder as well as specifying that directory for the `.ini` file.

Substitute your mapped drive for `m:`.

Spacing is critical with this command. A space should precede `/s`, `/v`, and `/qn` but should not appear anywhere else for the command to work correctly.

---

```
C:\>net use m: \\server_name\share
The command completed successfully
C:\>M:
M:\>setup_1352 /s /v"DTSETUPINI=\"m:\DTSetup.ini\" /qn"
```

10. After the installation is complete, reboot each machine.

---

**NOTE:** If you have configured the AutoReboot option to yes, the machine will automatically reboot.

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## Planning your upgrade

Storage Mirroring 4.4 can interoperate back to version 4.2 but is restricted to the following limitations. The Storage Mirroring clients can only control the same or earlier releases as outlined in the chart below. But to accommodate rolling upgrades, older sources can connect to newer targets as outlined in the second chart below. Configurations not listed in the charts are not supported.

**Storage Mirroring Client Interoperability**

Client Version	Can Manage Server Version
4.2	4.2 or earlier
4.3	4.3 or earlier
4.4	4.4 or earlier

**Storage Mirroring Server Interoperability**

Source Version	Can Connect to Target Version
4.2	4.2 or later
4.3	4.3 or later
4.4	4.4 or later

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**NOTE:** When performing a rolling upgrade, update the target servers first. After the upgrade is complete and the target servers are rebooted, the sources will automatically reconnect to the targets. Upgrade the sources when convenient.

If you are using a chained configuration, update the last target first, then update the middle server acting as both a source and target, and update the production source last.

If you are using a configuration where the source is an older version than the target, you will not be able to restore from the newer version target back to the older version source. You must upgrade the source to the same version as the target before restoring.

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## Upgrading, modifying, or repairing Storage Mirroring

If you already have Storage Mirroring installed, you can upgrade, modify, upgrade and modify, or repair your installation. The choices will depend on the version of the installation you are using.

- ◆ **Upgrade**—Select Upgrade if you already have Storage Mirroring installed and are upgrading to a newer version.
- ◆ **Modify**—Select Modify if you already have Storage Mirroring installed and need to make modifications to the installation, such as install components that were not previously installed.
- ◆ **Upgrade and Modify**—Select Upgrade and Modify if you already have Storage Mirroring installed and are upgrading to a newer version and also need to make modifications to the installation, such as install components that were not previously installed.
- ◆ **Repair**—Select Repair if you already have Storage Mirroring installed and need to repair errors in the program installation, such as fix or replace missing or corrupt files, shortcuts, or registry entries.

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**NOTE:** You will not be able to use a newer Storage Mirroring version to modify or repair a damaged program; you must use the same version. For example, you cannot repair a 4.2 version with a 4.3 CD.

If you do not have the original CD to perform an update because the software was pre-installed by your hardware vendor, contact that vendor for additional information.

Any existing Storage Mirroring log files will be deleted during an upgrade. If necessary, archive old files that you may need.

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1. Close any open applications.
2. Start the installation program by loading the Storage Mirroring CD into the local CD-ROM drive. If auto-run is enabled, the program will start automatically. To manually start the program, select **Start, Run** and specify `<cd_drive>:\autorun.exe`
3. When the Storage Mirroring installation program begins, the Welcome screen is displayed. Click **Next** to continue.
4. Review and accept the Storage Mirroring license agreement to continue with the installation program. Click **Next** to continue.
5. On the Storage Mirroring Setup dialog box, there are two selections available:
  - ◆ **Client and Server Components**—Installs the Storage Mirroring server and client components on the local machine.
  - ◆ **Client Components Only**—Installs the Storage Mirroring client on the local machine.Select either option and click **Next** to continue.

---

**NOTE:** The Program Maintenance dialog box will appear. If you do not see this dialog box, you have not previously installed Storage Mirroring and should be using the instructions [Installing Storage Mirroring](#) on page 3.

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6. On the Maintenance dialog box, there are three selections available. The options you see will depend on the Storage Mirroring version you are using.
  - ◆ **Upgrade**—This option upgrades an existing Storage Mirroring installation.
  - ◆ **Modify**—This option modifies an existing Storage Mirroring installation, such as installing components that were not previously installed.
  - ◆ **Upgrade and Modify**—This option upgrades an existing Storage Mirroring installation and modifies the previous installation, such as installing components that were not previously installed.
  - ◆ **Repair**—This option repairs an existing Storage Mirroring installation, such as fixing or replacing missing or corrupt files, shortcuts, or registry entries.
  - ◆ **Remove**—This option removes an existing Storage Mirroring installation.

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**NOTE:** If you do not see upgrade options, the Storage Mirroring version that you are attempting to upgrade to is not newer than the version that is currently installed.

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7. Select the appropriate option and click **Next** to continue.
8. The remaining screens are dependent on your selection on the Maintenance dialog:
  - ◆ **Modify Client and Server Components**—In order to modify any of your existing settings, all of the installation screens are presented in order. Step through each dialog box making the appropriate selection and then click **Install** to begin copying files.

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- ◆ **Repair or Upgrade Client and Server Components**—In order to repair or upgrade your server, you must provide your activation code for validation. After entering your code, click **Install** to begin copying files.
  - ◆ **Modify Client Components Only**—In order to modify your client only installation, select the appropriate options from the Custom dialog box and then click **Install** to begin copying files.
  - ◆ **Repair or Upgrade Client Components Only**—No selections are required for this option. Click **Install** to begin copying files.
9. After the files have completed copying, click **Finish** to exit the installation program.

---

**WARNING:** If you are prompted to restart your computer and you choose **No**, you must reboot the system prior to starting Storage Mirroring.

---

The Storage Mirroring updates are complete.

---

## Removing Storage Mirroring

Use these instructions if you want to remove an existing Storage Mirroring installation. These instructions use the remove feature built into the Storage Mirroring installation program.

---

**NOTE:** If desired, you can use the Add/Remove Programs function of the Windows Control Panel to remove Storage Mirroring. After you confirm that you want to uninstall the program, continue with step 8.

If you were using an MSCS cluster and any Storage Mirroring resources still exists in a cluster group (even if the resource is offline), the uninstall will not be able to remove the resource files. You must delete any resources prior to removing Storage Mirroring.

---

1. Close any open applications.
2. Start the installation program by loading the Storage Mirroring CD into the local CD-ROM drive. If auto-run is enabled, the program will start automatically. To manually start the program, select **Start, Run** and specify `<cd_drive>:\autorun.exe`
3. When the Storage Mirroring installation program begins, the Welcome screen is displayed. Click **Next** to continue.
4. Review and accept the Storage Mirroring license agreement to continue with the installation program. Click **Next** to continue.
5. On the Storage Mirroring Setup dialog box, there are two selections available:
  - ◆ **Client and Server Components**—Installs the Storage Mirroring server and client components on the local machine.
  - ◆ **Client Components Only**—Installs the Storage Mirroring client on the local machine.Select either option and click **Next** to continue.

---

**NOTE:** The Program Maintenance dialog box will appear. If you do not see this dialog box, you have not previously installed Storage Mirroring.

---

6. On the Maintenance dialog box, select **Remove** and click **Next** to continue.
7. The installation program is immediately ready to begin removing the Storage Mirroring files. Click **Remove** to continue.
8. You will be prompted to indicate whether or not you want to remove the Storage Mirroring security groups. Click **Yes** to continue.
9. A message prompt informs you that the uninstall program has completed successfully. Click **OK** and reboot the machine, if prompted.

Storage Mirroring has been removed from your machine.

---

**NOTE:** If you changed the location where the disk queue files are stored, these directories will not be removed during the installation. You will need to manually remove them.

---

---

## Removing Storage Mirroring automatically

Like the Storage Mirroring installation program, you can automate the removal of Storage Mirroring and use the default settings for any prompts. Use the following command on the machine where you want to remove Storage Mirroring. The command must be typed exactly as displayed below.

```
msiexec /x {F732639D-0899-11D4-9327-00A02471D5EC} /qn
```

After the uninstallation is complete, reboot each machine.



---

## Storage Mirroring Service

After Storage Mirroring is installed and the machine is rebooted, the service is automatically started. The Storage Mirroring service controls the core functionality of Storage Mirroring including mirroring, replication, and failover.

### Manually starting the service

1. Open the Services applet.  
**Windows 200x**—Select **Start, Programs, Administrative Tools, Services**.  
**Windows NT**—Select **Start, Settings, Control Panel** and double-click the **Services** icon.
2. Select the Storage Mirroring service.  
**Windows 200x**—Expand the Services and Applications tree on the left pane of the Computer Management window, select Services, and then double-click Storage Mirroring on the right pane of the Computer Management window.  
**Windows NT**—Double-click the Storage Mirroring service.
3. For the Storage Mirroring service, a startup parameter may be used, but it is optional. In the **Startup or Startup Parameters** field, enter one of the following switches:
  - ◆ **-s** to start Storage Mirroring as a source
  - ◆ **-t** to start Storage Mirroring as a target
  - ◆ **-x** to start Storage Mirroring as both a source and targetIf there are no startup parameters specified, the Storage Mirroring service will start both the source and target modules. This setting can be reconfigured from within the Storage Mirroring client software. If startup parameters are specified through the Computer Management or Control Panel, they will override any settings previously saved from within the client software.
4. Click **Start** to initialize the selected Storage Mirroring service.

### Manually stopping the service

1. Open the Services applet.  
**Windows 200x**—Select **Start, Programs, Administrative Tools, Services**.  
**Windows NT**—Select **Start, Settings, Control Panel** and double-click the **Services** icon.
2. Select the Storage Mirroring service.  
**Windows 2000**—Expand the Services and Applications tree on the left pane of the Computer Management window, select Services, and then double-click Storage Mirroring on the right pane of the Computer Management window.  
**Windows NT**—Highlight the Storage Mirroring service.
3. Stop the Storage Mirroring service by clicking **Stop**.

### Automatically starting and stopping the service

You can use batch files to automatically start and stop the Storage Mirroring service. Use the `net start` and `net stop` commands with the service name. You can also use these batch files in conjunction with other batch files or programs to automate your network startup or shutdown processes. Sample batch files are shown below.

#### Storage Mirroring\_Start.bat

```
@rem Starts the Storage Mirroring service
net start "Storage Mirroring"
```

#### Storage Mirroring\_Stop.bat

```
@rem Stops the Storage Mirroring service
net stop "Storage Mirroring"
```

---

## Storage Mirroring Clients

There are several clients available for Storage Mirroring.

- ◆ **Management Console**—32-bit GUI client that can manage and monitor all Storage Mirroring components including failover configuration. This client cannot initiate failover or failback or monitor failover activity. For basic details on the Management Console, begin with [The Management Console](#) below.
- ◆ **Text Client and Command Line Client**—Uses the DTCL (Double-Take Command Language) scripting language with commands for all Storage Mirroring operations. This client can initiate failover and failback but cannot monitor failover activity. For basic details on the text clients, begin with [Storage Mirroring text clients](#) on page 20.
- ◆ **Failover Control Center**—32-bit GUI client that can configure all aspects of failover and can monitor failover activity. For details on the Failover Control Center, see the *Storage Mirroring User's Guide*.

## The Management Console

The Management Console is a 32-bit GUI client that can manage and monitor Storage Mirroring components on any platform. Storage Mirroring machines are displayed along with active connection information. The Management Console can also configure failover settings.

---

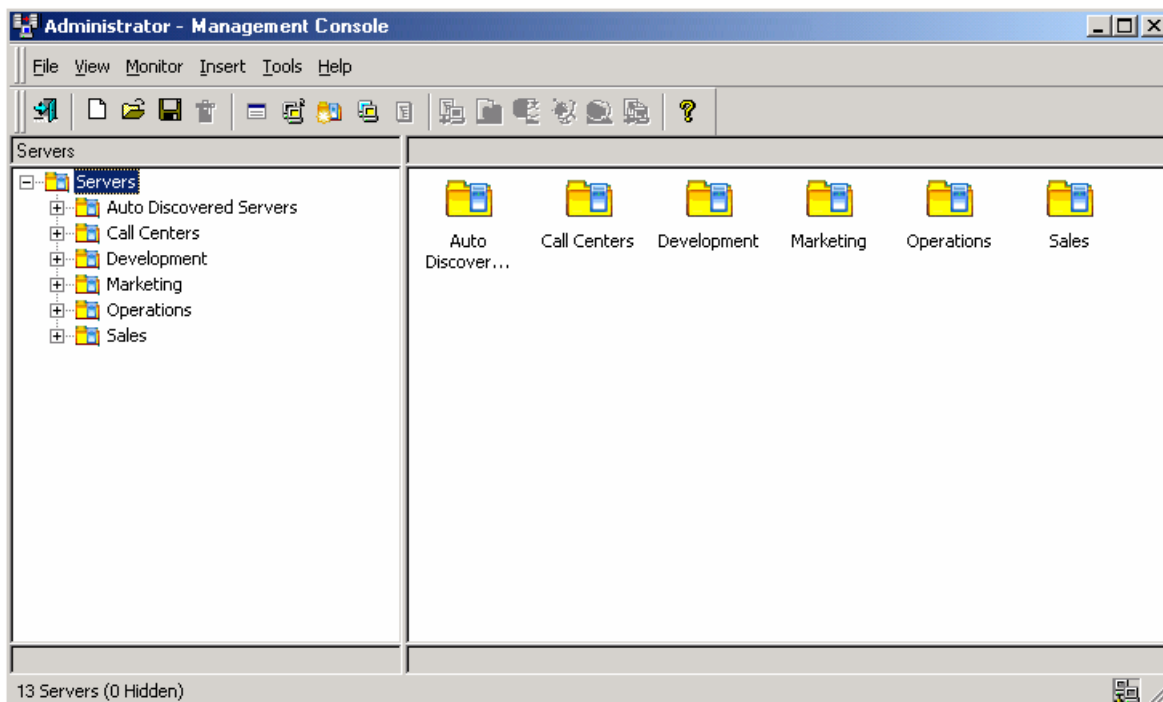
**NOTE:** You may not have access to some of the components or see certain display options if you are using a newer version of the Management Console to control an older version of your source or target.

---

## Starting the Management Console

From the machine that you installed the Storage Mirroring client, select **Start, Programs, Storage Mirroring, Management Console**.

The Management Console is divided into a left and right pane. The views in the panes change depending on what is highlighted. For example, in the left pane when the root of the tree, labeled Storage Mirroring Servers, is highlighted, all of the machines running Storage Mirroring are displayed in the right pane. If you double-click on the root, those same servers expand or collapse in the branches of the tree. More detailed information can be found in the *User's Guide*.














## Understanding the display

The left pane is a tree view displaying each machine running Storage Mirroring. As each machine name is highlighted, note the following items:




- ◆ The status bar at the top of the pane displays the modules loaded on each machine: Source, Target, Source and Target, or None. (None indicates that the core functionality of Storage Mirroring is running, but neither the source nor target modules have been loaded.)
- ◆ The icons in the left pane indicate what modules are loaded on each machine.

### Left Pane Icons




Icon	Description
	A blue server in front of a yellow folder indicates a group.
	The group icon with a yellow triangle and a black exclamation point indicates there is a communication error with one of the servers in the group.
	The group icon with a red circle with a white X indicates there is a connection error with one of servers in the group.
	A blue machine indicates a Storage Mirroring source.
	A yellow machine indicates a Storage Mirroring target.
	Yellow and blue machines indicate a Storage Mirroring source and target.
	A single machine with a hammer indicates that neither the source nor target modules are loaded.
	A machine with two red vertical lines over it indicates that the target module is paused.
	A machine with red horizontal lines over it indicates that a restore may be required because the target machine is or has been standing in for the source machine due to failover.
	Any of the machine icons can appear with a red X. The red X indicates: <ul style="list-style-type: none"><li>◆ The Management Console cannot communicate with that Storage Mirroring machine.</li><li>◆ There is a problem with an established Storage Mirroring connection.</li></ul> Look in the right pane of the Management Console or log on to the machine in the left pane to determine the exact problem.
	A machine icon can appear with a black X. The black X indicates that the machine is not running Storage Mirroring.

- ◆ The icon to the left of the machine name indicates the security access that is granted for that machine. For detailed information on security and access rights, see the *User's Guide*.

### Security Icons

Icon	Description	Access Granted
	This icon is a computer with a gear and it indicates the Storage Mirroring security is set to administrator access.	Administrator rights
	This icon is a computer with a magnifying glass and it indicates the Storage Mirroring security is set to monitor only access.	Monitor rights
	This icon is a lock and it indicates the Storage Mirroring security is set to no access.	No rights

- ◆ After you have logged into a machine, a collapsible and expandable tree view of the volumes and directories it contains is displayed. To expand the tree, click on the plus sign icon. To collapse the tree, click on the minus sign icon.
- ◆ Under each machine, you can create replication sets. Different icons represent different replication set states.

Icon	Description
	A red tree icon indicates a modified replication set that has not yet been saved.
	A black tree icon indicates a saved replication set.
	A blue tree icon indicates that the replication set has been modified in two separate instances of the Management Console and the modifications do not match.

- ◆ The right pane displays the following information depending on the item selected in the left pane of the Management Console and the tab selected on the right pane.

#### Right Pane Display

Left Pane	Right Pane	Description
Group	No Tabs	All groups and servers contained in the selected group are displayed.
Source Machine	Source Tab	The active connections, if any, from that source machine are displayed.
Source Machine	Target Tab	The display is blank.
Target Machine	Source Tab	The display is blank.
Target Machine	Target Tab	The active connections, if any, to that target machine are displayed. <sup>a</sup> The server name is also displayed, if it is in the Management Console tree. If it is not in the tree, the IP address is displayed.
Replication Set	No Tabs	The available target machines are displayed so that you can drag and drop a replication set onto a target to establish a connection.
Volume or Directory	No Tabs	The directories and files contained in that volume or directory are displayed.

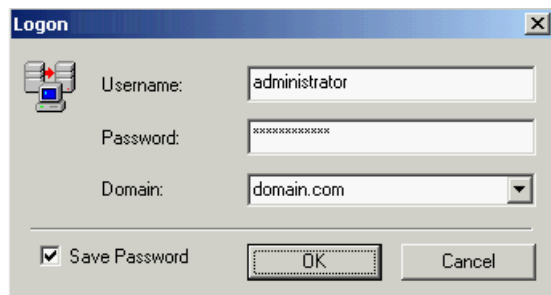
a. If transmission is stopped (manually stopped, outside of a scheduled transmission window, network error between the source and target, and so on) the replication set will not be displayed on the Target tab. When transmission (re)starts, the replication set will (re)appear.

---

## Logging on and off of Storage Mirroring

To ensure protection of your data, Storage Mirroring offers multi-level security using native operating system security features. Privileges are granted through membership in user groups defined on each machine running Storage Mirroring. To gain access to a particular Storage Mirroring source or target, the user must provide a valid operating system user name and password and the specified user name must be a member of one of the Storage Mirroring security groups. Once a valid user name and password has been provided and the Storage Mirroring source or target has verified membership in one of the Storage Mirroring security groups, the user is granted appropriate access to the source or target and the corresponding features are enabled in the client. Access to Storage Mirroring is granted on one of the following three levels:

- ◆ **Administrator Access**—All Storage Mirroring features are available for that machine. For example, this access level includes creating replication sets and establishing Storage Mirroring connections.
  - ◆ **Monitor Access**—Statistics can be viewed on that machine, but Storage Mirroring features are not available. For example, this access level does not allow the user to create or modify replication sets or create or modify Storage Mirroring connections, but does allow you to view the connection statistics for any established Storage Mirroring connections on that machine.
  - ◆ **No Access**—The machine appears in the Storage Mirroring Management Console and can be pinged from the Storage Mirroring Text Client, but no other access is available.
1. Highlight a machine on the left pane of the Management Console. By double-clicking the machine name, Storage Mirroring automatically attempts to log you on to the selected machine. Verify your access by the resulting icon.
  2. If you have no access, the Logon dialog box will automatically appear. If you have monitor access or want to log on with a different username, right-click the machine name and select **Logon**.



3. Specify your **Username**, **Password**, **Domain**, and whether you want your password saved. Click **OK**.

---

**NOTE:** If your activation code is missing or invalid, you will be prompted to open the Server Properties general tab to add or correct the code. Select **Yes** to open the Server Properties dialog box or select **No** to continue without adding an activation code.

---

4. Verify your access by the resulting icon and log on again if necessary.
5. To log off of a Storage Mirroring machine, right-click the machine name on the left pane of the Management Console and select **Logout**.

---

**NOTE:** For detailed information on Storage Mirroring security, see the *User's Guide*.

If the login does not complete within 30 seconds, it is automatically canceled. If this timeout is not long enough for your environment, you can increase it by adjusting the **Communication Timeout** on the Configuration tab of the Management Console properties. Select **File, Options**, from the Management Console to access this screen.

Storage Mirroring uses ICMP pings to verify server availability during the login process. If your Storage Mirroring server is across a router or firewall that has ICMP pings disabled, you will need to disable the Storage Mirroring ICMP ping verification. To do this, select **File, Options**, from the Management Console and disable **Use ICMP to verify server availability**.

---

---

## Getting help for the Management Console

Context-sensitive help is available in the Management Console by:

- ◆ Clicking **Help** when it appears on various dialog boxes
- ◆ Pressing the **F1** key
- ◆ Selecting **Help**, **Help Topics**

## Exiting the Management Console

To exit the Management Console, select **File**, **Exit** or select the **Exit** button on the toolbar.

---

## Storage Mirroring text clients

The Double-Take Command Language (DTCL) is a scripting language that can be used in either the Text Client or Command Line Client to manage and monitor Storage Mirroring components. It can also be used in script files to execute series and combinations of commands to meet specific needs.

Because the Text Client and Command Line Client use the same DTCL commands, all examples use the Text Client. For a complete listing of the DTCL commands and the conventions used to document them, see the *Storage Mirroring User's Guide*.

### The Text Client

The Text Client is a full-screen, text-based client that can be run from a command prompt. It can manage and monitor Storage Mirroring components on any platform regardless of the Text Client platform. The interface uses DTCL commands entered one line at a time. The Text Client offers command line editing capabilities, such as backspace cursor movement and forward/backward command history scrolling. All connection information is displayed in columnar text format on the screen.

### Starting the Text Client

From the Windows desktop, select **Start, Programs, Storage Mirroring, Text Client** or from a command prompt, type the command `DTText`.

---

**NOTE:** The `DTText` command name is not case-sensitive.

---

### Using the Text Client

The Text Client is divided into three sections:

- ◆ The top section displays source, connection, and statistical data. If specifying a command that requires output, like the `status` command, the output is also displayed in this section.
- ◆ The middle section is where the DTCL commands are entered.
- ◆ The lower section displays the DTCL command that was entered with any resulting messages. In this section, the security access granted is also displayed.

To use Storage Mirroring from the Text Client, enter the DTCL commands at the **Command** prompt in the middle of the Text Client screen.

Source Machine:	Storage Mirroring version 4.4
=====	
Command:	login indy administrator ***** domain_name
=====	
User access level set to DT_FULL_ACCESS	

---

## The Command Line Client

The Command Line Client can be run from a command prompt. It can manage and monitor Storage Mirroring components on any platform regardless of the Command Line Client platform. The Command Line Client is run from the operating system command line and the DTCL commands are run from the Storage Mirroring command line.

### Starting and using the Command Line Client

There are three different methods of executing commands from the Command Line Client:

- ◆ **Interactive Entry**—At the directory prompt where Storage Mirroring is installed, type the command `DTCL -i`. A DTCL Command prompt will appear and the commands can be entered from that prompt. Any resulting errors are immediately displayed.

#### Interactive Entry

```
C:\Program Files\Openview\Storage Mirroring> dtcl -i
Command: login indy administrator ***** domain_name
User access level set to DT_FULL_ACCESS
Command:
```

- ◆ **File Entry**—Create a file with all of the DTCL commands you want to run. At the directory prompt where Storage Mirroring is installed, type `DTCL -f filename` where `filename` is the name of the file containing the DTCL commands. For example, you might use the following `dtcl.txt` file to log on to a machine and display its replication sets.

#### File Entry

```
C:\Program Files\Openview\Storage Mirroring> dtcl -f dtcl.txt
User access level set to DT_FULL_ACCESS
- List of rep sets -
Exchange                               enabled
C:\Program Files\Openview\Storage Mirroring>
```

#### DTCL.TXT Used in File Entry

```
login indy administrator password domain_name;
source indy;
repset list;
```

- ◆ **Single Line Entry**—Determine all of the DTCL commands you want to run and enter them in a single line at the command prompt where Storage Mirroring is installed. For example, you might use the following command to log on to a machine and display its replication sets.

#### Single Line Entry

```
C:\Program Files\Openview\Storage Mirroring> dtcl login indy administrator
password; source indy; repset list
User access level set to DT_FULL_ACCESS
- List of rep sets -
Exchange                               enabled
C:\Program Files\Openview\Storage Mirroring>
```

---

**NOTE:** Because CMD.exe strips two layers of quotation marks during processing, any DTCL command that you use that requires quotation marks must have three quotation marks around it. For example, if your machine name had a space in it, login "machine name" username password would be sufficient for the Text Client or the Command Line Client interactive entry or file entry. But for the Command Line Client single line entry, you would have to use login """"machine name"""" username password.

---



---

## Logging on and off of Storage Mirroring

To ensure protection of your data, Storage Mirroring uses native operating system security and requires a valid system username and password. If you do not have a valid system username and password for a selected machine, you will not be able to configure Storage Mirroring for that machine.

As you enter DTCL commands, Storage Mirroring automatically attempts to log on to the source or target machine. You can verify your access by the resulting message.

- ◆ **DT\_Full\_Access**—You have administrator rights to the selected Storage Mirroring machine.
- ◆ **DT\_Monitor\_Only\_Access**—You have monitor rights to the selected Storage Mirroring machine.
- ◆ **DT\_No\_Access**—You do not have any rights to the selected Storage Mirroring machine.

You can also verify your access at the top of the Text Client screen depending on the commands you have entered and the information displayed in the upper half of the screen.

If you have monitor access or no access and want to log on as the administrator, use the `login` command. Log off of a machine by using the `logout` command.

<b>Command</b>	LOGIN
<b>Description</b>	Log on to a Storage Mirroring machine
<b>Syntax</b>	LOGIN <machine> <username> <password> [domain]
<b>Options</b>	<ul style="list-style-type: none"><li>◆ <b>machine</b>—Name of the machine</li><li>◆ <b>username</b>—Name of the user</li><li>◆ <b>password</b>—Password associated with username.</li><li>◆ <b>domain</b>—If logging in using a domain account, this is the domain name. If logging in using a local account, this is the machine name.</li></ul>
<b>Examples</b>	login indy administrator *****
<b>Notes</b>	<ul style="list-style-type: none"><li>◆ The <code>login</code> command is not available when scrolling through the Text Client command history.</li><li>◆ If characters in the password include non-alphanumeric characters, the password field must be enclosed in quotation marks.</li><li>◆ The password cannot be a Storage Mirroring keyword. These are any DTCL command (source, target, and so on.) or any DTCL shortcut command (env, mon, rep, and so on).</li></ul>

<b>Command</b>	LOGOUT
<b>Description</b>	Logs off of a Storage Mirroring machine
<b>Syntax</b>	LOGOUT <machine>
<b>Options</b>	<b>machine</b> —Name of the machine
<b>Examples</b>	logout indy

---

## Getting help in the text clients

A listing of the DTCL commands and their syntax is available in the Storage Mirroring Text Client and Command Line Client by typing the `help` command.

<b>Command</b>	<code>HELP</code>
<b>Description</b>	Displays the DTCL commands and their syntax
<b>Syntax</b>	<code>HELP</code>
<b>Notes</b>	<ul style="list-style-type: none"><li>◆ Press any key to scroll through the list of commands.</li><li>◆ Press <code>q</code> to exit the help function.</li><li>◆ You can also type <code>dtcl help</code> from the directory where the Storage Mirroring program files are installed to display the DTCL commands and their syntax.</li></ul>

## Exiting the text clients

To exit the Storage Mirroring Text Client and Command Line Client, type the `exit` or `quit` command.

<b>Command</b>	<code>EXIT</code>
<b>Description</b>	Exits the Text Client and the Command Line Interactive client
<b>Syntax</b>	<code>EXIT</code>

<b>Command</b>	<code>QUIT</code>
<b>Description</b>	Quits the Text Client and the Command Line Interactive client
<b>Syntax</b>	<code>QUIT</code>

---

## Establishing a Connection

You have three options for establishing a connection:

- ◆ Using the automated Connection Wizard in the Management Console
- ◆ Using the Connection Manager in the Management Console
- ◆ Using the Text Client

### Connection Wizard connection

The first time you start the Storage Mirroring Management Console, the Welcome screen leads you to the Storage Mirroring Connection Wizard. The Connection Wizard will guide you through the essential steps necessary to establish a basic connection. In the Connection Wizard, you specify:

- ◆ **Source**—The machine containing the data to protect. This is your production server.
- ◆ **Target**—The machine to receive the data from the source. This is your backup server.
- ◆ **Replication Set**—The data to be protected.
- ◆ **Target Location**—The location on the target machine to store the data.
- ◆ **Advanced Options**—The Connection Wizard allows you to open the Connection Manager to set advanced options.

1. In the Storage Mirroring Management Console, select **Tools, Connection Wizard**.

---

**NOTE:** In order for the **Connection Wizard** menu option to be available, you must have a source or target highlighted in the left pane of the Management Console. You do not need to be logged on to the machine. If the Storage Mirroring Servers root is highlighted, the **Connection Wizard** option will not be available.

At any time while using the Connection Wizard, select **Back** to return to previous screens and review your selections.

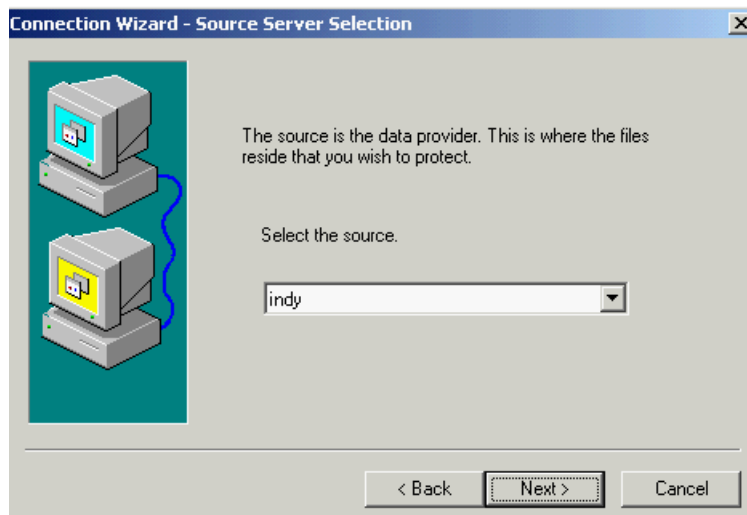
---

2. The Connection Wizard opens to the Welcome screen. Review this screen and click **Next** to continue.
3. If you highlighted a source in the Management Console, the source will already be selected. If it is not, select the Storage Mirroring source. This is the machine where the files reside that you wish to protect. Click **Next** to continue.

---

**NOTE:** Storage Mirroring will automatically attempt to log on to the selected source using the identification of the user logged on to the local machine. If the logon is not successful, the Logon dialog box will appear prompting for your security identification.

---



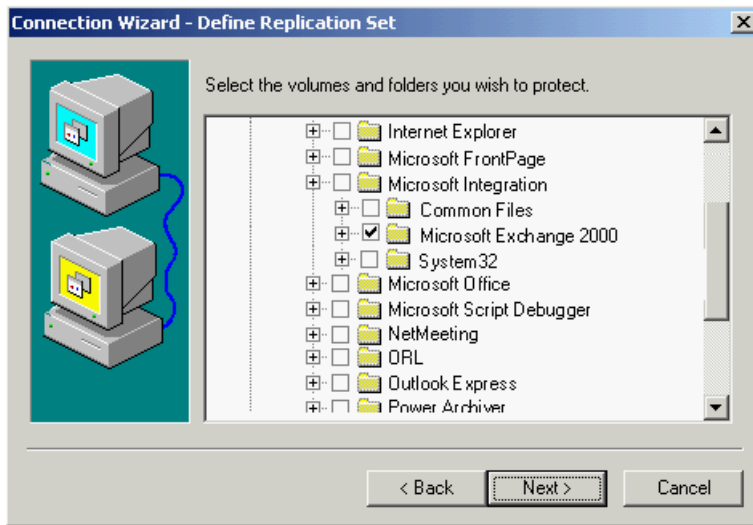
4. If you highlighted a target in the Management Console, the target will already be selected. If it is not, select the Storage Mirroring target. This is your backup machine that will receive the data from the source. Click **Next** to continue.

---

**NOTE:** Storage Mirroring will automatically attempt to log on to the selected target using the identification of the user logged on to the local machine. If the logon is not successful, the Logon dialog box will appear prompting for your security identification.

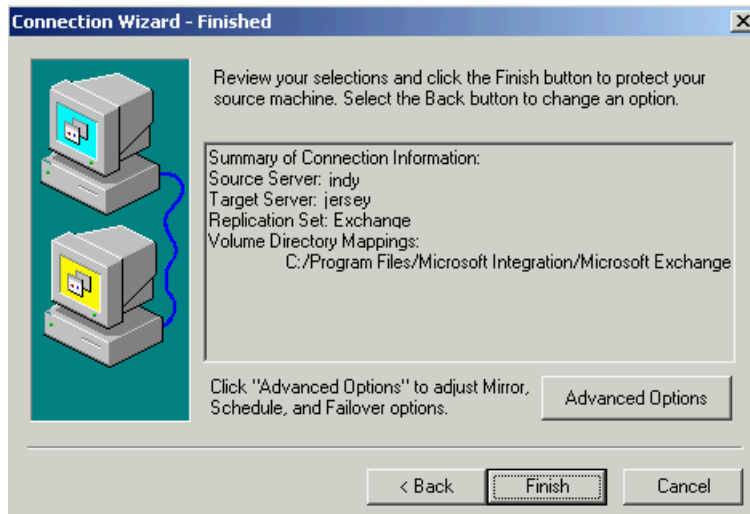
---

5. Choose to create a new replication set or use a replication set that already exists.
  - ◆ If you choose to create a new replication, specify a replication set name.
  - ◆ If you choose to use an existing replication set, specify the name of that replication set by selecting it from the pull-down menu.Click **Next** to continue.
6. If you choose to create a new replication set, a tree display appears identifying the volumes and directories available on that source machine. Mark the check box of the volumes and/or directories you wish to protect. Click **Next** to continue.



7. Select the location on the target machine where the data will be stored.
  - ◆ **Send all data to a single path on the target**—This option sends all selected volumes and directories to the default location:  
`/source_name/replication_set_name/`
  - ◆ **Send all data to the same path on the target**—This option sends all selected volumes and directories to the same directories on the target machine. For example, `c:\data` and `d:\files` on the source will go to `c:\data` and `d:\files`, respectively, on the target.
  - ◆ **Custom**—To select a custom path, click once in the **Target Path** field and modify the drive and directory to the desired location.
8. Click **Next** to continue.

9. Review your selections on the summary screen.



10. If your Connection Wizard settings are correct, establish your connection by completing one of the two options below:

- ◆ If you do not want to set advanced options, click **Finish**.

---

**NOTE:** If you created a new replication set in step 5, you will be prompted at this time to save the replication set. Click **Yes** to save the replication set or click **No** to go back to the Finished dialog box. Click **Back** if you need to return to the replication set selection.

---

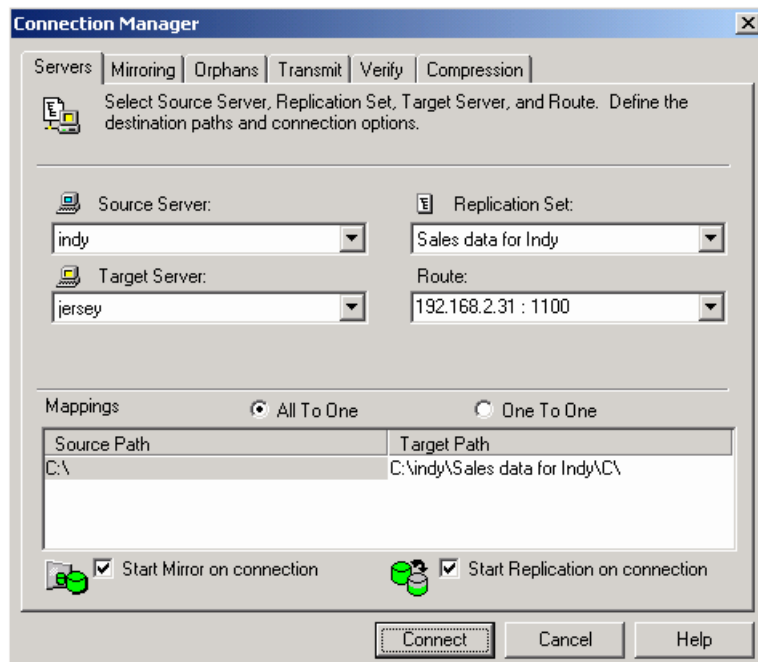
The Connection Wizard will close, the connection will be established, and mirroring and replication will begin. To view your connection, highlight the source machine in the left pane of the Management Console. The active connection is displayed in the right pane of the Management Console. For detailed information on the Management Console statistics that are available for an established connection, see the *Storage Mirroring User's Guide*.

- ◆ If you want to set advanced options, click **Advanced Options**. The Connection Wizard will close and the Storage Mirroring Connection Manager will open. The **Servers** tab will be completed. To set advanced settings, select a tab in the Connection Manager and reference the chapter in the *Storage Mirroring User's Guide* that corresponds to the tab name.

## Connection Manager connection

1. There are four methods available for opening the Connection Manager and establishing a connection manually:
  - ◆ Highlight a replication set and select **Tools, Connection Manager**.
  - ◆ Right-click on a replication set and select **Connection Manager**.
  - ◆ Drag and drop a replication set to a target machine on the left pane of the Management Console.
  - ◆ Highlight a replication set and then drag and drop the replication set to a target machine on the right pane of the Management Console.

The Connection Manager opens to the **Servers** tab.



2. Some entries on the **Servers** tab will be completed depending on which method you used to access it. For example, if you entered the Connection Manager by right-clicking on a replication set, the name of the replication set will be displayed in the replication set field.
3. Verify the correct source machine and replication set were selected from the Management Console. If they are not, use the **Source Server** and **Replication Set** fields to identify the source machine and replication set for which you want to establish the connection.
4. Depending on the method you used to open the Connection Manager, the **Target Server** and **Route** fields may or may not be completed. If they are not, select a target machine and the primary IP address of that machine will automatically appear. If you have multiple IP addresses on your target, verify the **Route** field is set to the correct network path.

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**NOTE:** To initiate a connection using the Resource Planning Tool, select the **Diagnostics** target. The **Route** field will automatically populate with **Throughput Diagnostics Utility (TDU)**. For detailed information on statistics logging, see the *Storage Mirroring User's Guide*.

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5. Select the target path, which corresponds to the desired location on the target where the replicated data will reside, by selecting **One-to-One** or **All-to-One**. If you want to specify a custom location, select either of the radio buttons and then click on the directory entry under the Target Path column. You will be in edit mode and can specify the desired location on the target for the replicated data.
6. If you want mirroring and/or replication to start immediately when the connection is established, mark either or both of the two check boxes at the bottom of the **Servers** tab.

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**NOTE:** Other tabs are available in the Connection Manager to set advanced connection settings. To establish a connection, you do not need to make modifications to these tabs; a connection can be established with the default settings. For more information, see the *Storage Mirroring User's Guide*.

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7. Click **Connect** to establish the connection.

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## Text client connection

1. Log on to the Storage Mirroring source machine. This is the machine where the files reside that you wish to protect. Log on by using the `login` command.

<b>Command</b>	<code>LOGIN</code>
<b>Description</b>	Log on to a Storage Mirroring machine
<b>Syntax</b>	<code>LOGIN &lt;machine&gt; &lt;username&gt; &lt;password&gt; [domain]</code>
<b>Options</b>	<ul style="list-style-type: none"><li>◆ <b>machine</b>—Name of the machine</li><li>◆ <b>username</b>—Name of the user</li><li>◆ <b>password</b>—Password associated with username.</li><li>◆ <b>domain</b>—If logging in using a domain account, this is the domain name. If logging in using a local account, this is the machine name.</li></ul>
<b>Examples</b>	<code>login indy administrator *****</code>
<b>Notes</b>	<ul style="list-style-type: none"><li>◆ The <code>login</code> command is not available when scrolling through the Text Client command history.</li><li>◆ If characters in the password include non-alphanumeric characters, the password field must be enclosed in quotation marks.</li><li>◆ The password cannot be a Storage Mirroring keyword. These are any DTCL command (source, target, and so on.) or any DTCL shortcut command (env, mon, rep, and so on).</li></ul>

2. Log on to the Storage Mirroring target machine. This is the machine that will receive the data and possibly stand in for the source machine. Log on by using the `login` command.
3. Specify your Storage Mirroring source machine by using the `source` command.

<b>Command</b>	<code>SOURCE</code>
<b>Description</b>	Identifies a machine as the active source machine
<b>Syntax</b>	<code><u>SOURCE</u> &lt;source_machine&gt;</code>
<b>Options</b>	<b>source_machine</b> —Name of the machine
<b>Examples</b>	<code>source indy</code>

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4. Create a new replication set using the `repset create` command.

<b>Command</b>	<b>REPSET CREATE</b>
<b>Description</b>	Creates a replication set
<b>Syntax</b>	<b>REPSET CREATE</b> <name>
<b>Options</b>	<b>name</b> —Name of the replication set
<b>Examples</b>	<ul style="list-style-type: none"><li>♦ <code>repset create "Exchange Repset"</code></li><li>♦ <code>repset create marketing</code></li></ul>
<b>Notes</b>	<ul style="list-style-type: none"><li>♦ If the replication set name includes non-alphanumeric characters, the name must be enclosed in quotation marks.</li><li>♦ If the name of the replication set is the same as a word used in a DTCL command (for example, <code>repset create repset</code>), you will receive an error. If you want to use a word like this, you must enclose it in quotation marks (<code>repset create "repset"</code>).</li></ul>

5. Specify the data to be protected by creating replication set rules. Define a rule by using the `repset rule add` command.

<b>Command</b>	<b>REPSET RULE ADD</b>
<b>Description</b>	Adds a rule to a replication set. A rule is the specification of a path including volume, directories, wild cards, and/or file names.
<b>Syntax</b>	<b>REPSET RULE ADD</b> <path> [ <u>INCLUDE</u>   <u>EXCLUDE</u> ][, <u>RECURSIVE</u>   <u>NONRECURSIVE</u> ] [TO <repset>]
<b>Options</b>	<ul style="list-style-type: none"><li>♦ <b>path</b>—Volume, directory, wild card, and/or file name</li><li>♦ <b>INCLUDE</b>—Include the specified path in the replication set</li><li>♦ <b>EXCLUDE</b>—Exclude the specified path in the replication set</li><li>♦ <b>RECURSIVE</b>—All subdirectories and files are recursively included or excluded</li><li>♦ <b>NONRECURSIVE</b>—All subdirectories and files are non-recursively included or excluded</li><li>♦ <b>repset</b>—Name of the replication set</li></ul>
<b>Examples</b>	<code>repset rule add c:\exchange to "Exchange Repset"</code>
<b>Notes</b>	<ul style="list-style-type: none"><li>♦ The default settings for this command are include and recursive.</li><li>♦ If you do not specify a replication set name, the current replication set will be used.</li><li>♦ If the path begins with a non-alphabetic character or if the replication set name includes non-alphanumeric characters, the path or name must be enclosed in quotation marks.</li><li>♦ Verify what files can be included by reviewing <i>Replication Capabilities</i> in the <i>Storage Mirroring User's Guide</i>.</li></ul>

6. Repeat the `repset rule add` command to define all of the data to be protected.



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7. If you make an error when creating a replication set, use the `repset rule remove` command.

<b>Command</b>	<b>REPSET RULE REMOVE</b>
<b>Description</b>	Removes a rule from a replication set
<b>Syntax</b>	REPSET RULE <u>REMOVE</u> <path> [FROM <repset>]
<b>Options</b>	<ul style="list-style-type: none"><li>◆ <b>path</b>—Volume, directory, wild card, and/or file name</li><li>◆ <b>repset</b>—Name of the replication set</li></ul>
<b>Examples</b>	<code>repset rule remove c:\exchange from "Exchange Repset"</code>
<b>Notes</b>	<ul style="list-style-type: none"><li>◆ If you do not specify a replication set name, the current replication set will be used.</li><li>◆ If the path begins with a non-alphabetic character or if the replication set name includes non-alphanumeric characters, the path or name must be enclosed in quotation marks.</li></ul>

8. Verify the replication set rules defined by using the `repset display` command.

<b>Command</b>	<b>REPSET DISPLAY</b>
<b>Description</b>	Displays the rule of a replication set
<b>Syntax</b>	REPSET <u>DISPLAY</u> [ <b>repset</b> ]
<b>Options</b>	<b>repset</b> —Name of the replication set
<b>Examples</b>	<ul style="list-style-type: none"><li>◆ <code>repset display</code></li><li>◆ <code>repset display Exchange</code></li></ul>
<b>Notes</b>	<ul style="list-style-type: none"><li>◆ If you do not specify a replication set name, the current replication set will be used.</li><li>◆ If the replication set name includes non-alphanumeric characters, the name must be enclosed in quotation marks.</li></ul>

9. After you have added all of the rules, save the replication set by using the `repset save` command.

<b>Command</b>	<b>REPSET SAVE</b>
<b>Description</b>	Saves all replication set rules for the currently selected source
<b>Syntax</b>	REPSET SAVE

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10. Connect the repset to the target by using the `connect` command.

<b>Command</b>	CONNECT
<b>Description</b>	Establishes a connection between a replication set and a target machine
<b>Syntax</b>	<pre>CONNECT &lt;repset&gt; TO &lt;target_machine&gt;     MAP EXACT       MAP BASE &lt;target_path&gt;       MAP &lt;source_path&gt; TO &lt;target_path&gt; [...]</pre> <p>[<u>MIRROR</u>   <u>NOMIRROR</u>] [, <u>REPLICATE</u>   <u>NOREPLICATE</u>] [, <u>MONITOR</u>   <u>NOMONITOR</u>] [, <u>ORPHANS</u>   <u>NOORPHANS</u>] [, <u>COMPRESSION</u> &lt;level&gt;] [<u>CLEARRESTOREREQUIRED</u>]</p>
<b>Options</b>	<ul style="list-style-type: none"><li>◆ <b>repset</b>—Name of the replication set</li><li>◆ <b>target_machine</b>—Name of the target machine, an IP address on the target machine, or a virtual IP address</li><li>◆ <b>MAP EXACT</b>—Specifies that the replication set data will be sent to the same logical volume on the target (c:\data and d:\files is copied to c:\data and d:\files, respectively)</li><li>◆ <b>MAP BASE target_path</b>—Substitute a complete path, including the volume, for <b>target_path</b> and the data will be replicated to target_path\SrcVolName on the target machine</li><li>◆ <b>MAP source_path TO target_path</b>—Custom location that specifies each directory on the source and where that data will be copied to on the target machine</li><li>◆ <b>...</b>—Indicates that the <b>source_path TO target_path</b> option can be used more than once for each source directory in the replication set</li><li>◆ <b>MIRROR</b>—Automatically initiates a mirror when the connection is established</li><li>◆ <b>NOMIRROR</b>—Does not initiate a mirror when the connection is established</li><li>◆ <b>REPLICATE</b>—Automatically initiates replication when the connection is established</li><li>◆ <b>NOREPLICATE</b>—Does not initiate replication when the connection is established</li><li>◆ <b>MONITOR</b>—Specifies that the target is going to monitor the specified source machine for failover. The source machine must have already been defined as a monitor machine.</li><li>◆ <b>NOMONITOR</b>—Specifies that the target is not going to monitor the source machine for failover</li><li>◆ <b>ORPHANS</b>—Removes orphan files on the target</li><li>◆ <b>NOORPHANS</b>—Does not remove orphan files on the target</li><li>◆ <b>COMPRESSION level</b>—Sets the compression level for data being sent to the target using levels 1 through 3 with 1 being minimum compression and 3 being maximum compression. This option sets the level only. It does not enable compression.</li><li>◆ <b>CLEARRESTOREREQUIRED</b>—Clears the restore required flag and initiates the connection</li></ul>
<b>Examples</b>	<ul style="list-style-type: none"><li>◆ connect Exchange to jersey map exact</li><li>◆ connect sql to jersey map base d:\DTFiles\</li></ul>
<b>Notes</b>	<ul style="list-style-type: none"><li>◆ The default settings for this command are mirror, replicate, nomonitor, and noorphans.</li><li>◆ If a path begins with a non-alphabetic character or if the replication set name includes non-alphanumeric characters, the path or name must be enclosed in quotation marks.</li><li>◆ If you are establishing a connection within a NAT environment, you will need to specify the port of the router after the IP address (seperated by a colon).</li></ul>

Your Storage Mirroring connection is now established. To configure advanced options for a connection, see the *Storage Mirroring User's Guide*.